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could not reduce the cost of production below that of plates made by the ordinary method, and that the waste by oxidation on the one hand, and the mischief of foul bottoms when oxidation was checked on the other, were insuperable barriers to his success," he gave up any further attempt. Nevertheless, his investigations on the subject suggested the idea of employing resins insoluble in water as an effectual protection to ships' bottoms. Moreover, he considered that, by combining elastic with non-elastic substances, and adding to the composition certain ingredients which are known to be destructive both to animal and vegetable life, he might readily attain his object. The *Teredo Navalis*, or ship-worm, he especially had in view, as the greatest enemy to be overcome.

In the course of a series of experiments which Mr. Jeffery tried with various substances, he succeeded in discovering the composition to which he has given the name of "marine glue," the peculiar properties of which are its being insoluble in, and impervious to, water; elastic, so as to expand or contract according to the strain on the timber or the changes of temperature; sufficiently solid to fill up the joints, and add strength to the timber construction; and adhesive, so as to connect the timbers firmly together.

To make the marine glue:—A solution is first made of caoutchouc of good quality with coal naphtha, in the proportion of one pound of the caoutchouc to five gallons of the naphtha. The caoutchouc is cut into thin shreds before being used; and the mixture is stirred until the caoutchouc is so dissolved as to bring it to the consistence of thick cream. Mr. Jeffery finds that the caoutchouc is sufficiently dissolved in about ten or twelve days.

One part by weight of the above described solution, and two parts by weight of shel-lac, are then put into an iron vessel. The whole is then heated and stirred until thoroughly amalgamated: and this substance constitutes the marine glue.

SILVER PLATING AS PRACTISED AT SHEFFIELD.

By Mr. Potter, Jun.

Plating on copper was first introduced in the year 1742 by Mr. Thomas Bolsover, a member of the Corporation of Cutlers at Sheffield, who, when repairing a knife-handle, composed partly of silver and partly of copper, suddenly thought that it might be possible so to unite the two metals as to form a cheap substance, which, presenting an exterior of silver, might be used for the manufacture of several articles hitherto made entirely of that metal. It was not till about forty years after the introduction of Mr. Bolsover's plan that the ornamented parts of plated articles, called mountings, were constructed of silver. This great improvement caused the manufacture of plated wares to become one of the staple trades of Sheffield.

There are two important features in the process of silver-plating, the one a perfect adhesion of the two metals, the other a protection from wear of the prominent edges by friction.

The process of manufacturing plated articles may be described as follows:—

An ingot of copper being cast and the surfaces carefully prepared by filing, so as to remove all blemishes, and a piece of silver, also having one surface perfectly cleaned, are tied together by means of iron-wire. A paste of borax and water is then passed round the edges with a quill, and the mass being placed in a common air-furnace, is heated to a proper temperature, which is ascertained by means of a small aperture in the door. As soon as the union of the two bodies is effected (which is known by the oozing of the metal when the fusion of the two metals has taken place), the bar is removed from the furnace. The quality of the silver used in this process is what is termed standard, containing about 18 dwts. of copper, to the pound troy. The effect of this alloy is to render the articles harder, and consequently more durable.

The ingot being thus prepared, the next operation is to form it into sheets, which is effected by passing the bar several times through large cylindrical rollers, generally moved by steam-power; the lamination which the silver undergoes during the operation of rolling shews the perfect union of the two metals.

The dies for forming the ornamental parts of plated articles consist of blocks of steel, on the face of which the pattern of the ornament is accurately drawn, after which the dies are moderately heated in an open fire, and then placed upon a leathern sandbag; the die-sinker then proceeds to cut out the ornaments with hammer and chisel. When sunk to the proper depth, the surface of the sinking is dressed off and prepared for the ornaments to be stamped in.

The stamping machine (of which a small working model was exhibited) consists of a vertical frame of iron, the uprights of which are formed with grooves in which the hammer or drop slides. The foundation of this machine consists of a square stone, on the upper surface of which is fixed an iron anvil, to which the uprights are firmly attached. The hammer is raised by a rope passing over a pulley fixed in the head-piece of the frame. The die is placed on the anvil immediately under the hammer, and kept in its proper position by screws. A luting of oil and clay is placed round the edge of the sink of the die, and melted lead is then poured into the cavity. When cool, the hammer is allowed to fall upon the lead, to which it firmly adheres by means of a plate roughed as a rasp, which is called the *lick-up*.

The silver used for the purpose of the mountings is also of standard quality, and is rolled to the required thickness; several pieces of the requisite size are then placed between pieces of copper of the same substance, and put upon the face of the die. The hammer is then raised and allowed to fall gently upon them. This operation is continued for some time, gradually increasing the fall of the hammer, and diminishing the number of pieces struck, until they are forced to the bottom of the die; it is necessary occasionally to anneal the mountings.

The mounts being struck as described are now filled with solder, consisting of tin and lead, and afterwards secured by wires to the article to be ornamented, the body being covered with a mixture of glue and whiting to prevent the solder from staining the surface; they are then soldered on by means of a gas blowpipe.

The article is next boiled in a solution of pearl-ash or soda, and scoured with fine Calais sand. The mounts are polished by a lathe, as in the case of silver articles, with rotten-stone and oil, then cleaned with whiting, and finished with rouge; a scratch-brush of brass-wire is used for deadening the parts required, and the plain surfaces are burnished with tools of blood-stone or steel, soap and water being used in this operation, which is performed by women.

ON SPADE-HUSBANDRY.

By H. Fardon, Esq.

The object of this communication is to shew the importance, in a national point of view generally throughout the country, of an improved mode of cultivation by means of spade-husbandry.

After entering into details with respect to the two systems of agriculture chiefly pursued throughout the kingdom, which are known as the *low system* and the *high system*, the former being based on the system of annual tenancy, the latter on that of granting leases; the writer proceeds with an examination of the third system, or spade-husbandry, and quotes, among others, the following case, as shewing the great profit to be realised by its judicious adoption:—

The experiment was made on two acres of land for twenty-seven years, and on two other acres of land for fifteen years, alternate crops of wheat and potatoes being regularly produced, and the land, which is stiff clay, turned up with a fork ten inches deep.